

PARUL UNIVERSITY
FACULTY OF ENGINEERING & TECHNOLOGY
M.Tech. Winter 2018 - 19 Examination

Semester: 1
Subject Code: 203207101
Subject Name: Power System Analysis

Date: 10/12/2018
Time: 10:30am to 1:00pm
Total Marks: 60

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 A) With the help of sequence network derive expressions for sequential components for an L-L-G fault on a power system. (05)

B) Explain contingency analysis with flow chart. (05)

C) Compare GS and NR method of load flow. (05)

Q.2 Answer the following questions. (Attempt any three) (Each five mark) (15)

A) What is meant by per unit system? State advantages of per unit system.

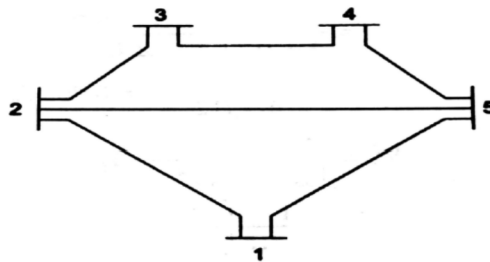
B) Explain power system security.

C) A 50 MVA, 11 kV, 3-phase alternator was subjected to single line to ground fault. The fault currents of single line to ground fault is 4130 A. The alternator neutral is solidly grounded. Find the per unit values of the three sequence reactance of the alternator.

D) Explain how estimation of non linear measurements is done using Weighted LSE.

Q.3 A) Explain the difference between Jacobean Matrix of NR method and decoupled method. What is the reason of absent of slack bus in Jacobean matrix? (07)

B) Below figure shows five bus power systems. Each line has an impedance of $0.05+j0.15$ pu. The line shunt admittances may be neglected. (08)



The bus power and voltage specifications are given below:

Bus	P_L	Q_L	P_G	Q_G	V	Bus Specification
1	1.0	0.5	Not Specified	Not Specified	$1.02 \angle 0$	Slack Bus
2	0	0	2	Not Specified	1.02	PV Bus
3	0.5	0.2	0	0	Not Specified	PQ Bus
4	0.5	0.2	0	0	Not Specified	PQ Bus
5	0.5	0.2	0	0	Not Specified	PQ Bus

(a) Form Y_{bus} (b) Find Q_2 , δ_2 , V_3 , V_4 and V_5 after the first iteration using Gauss-Seidel method. Assume $Q_{2,min} = 0.2$ pu and $Q_{2,max} = 0.6$ pu.

OR

B) Draw and explain state estimation solution algorithm. (08)

Q.4 A) What is voltage collapse? Enlist the main factors that contribute the phenomena of voltage collapse. (07)

OR

A) Explain in detail about static voltage stability analysis (07)

B) Explain about types of criterions used in static voltage stability analysis. (08)